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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/611,845	07/01/2003	Tang-Wei Kuo	GP-303270	2773
7590 05/04/2004				
KATHRYN A MARRA General Motors Corporation Mail Code 482-C23-B21 P.O. Box 300 Detroit, MI 48265-3000		EXAMINER CORRIGAN, JAIME W		
		ART UNIT 3748 PAPER NUMBER		
DATE MAILED: 05/04/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/611,845

Applicant(s)

KUO ET AL.

Examiner

Jaime W Corrigan

Art Unit

3748

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 14 October 2003.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Objections

Claim 20 is objected to because of the following informalities:

The word --degrees-- should be inserted after number "60". Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 5-7, 11, 15-19, 30-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Miyakubo et al. (PN 6,336,436).

Regarding claims 1, 15, 30 Miyakubo discloses a method of operating a four-stroke internal combustion engine (See Abstract) including a variable volume combustion chamber defined by a piston (See Figure 1 (13)) reciprocating within a cylinder between top-dead center and bottom-dead center points and at least one intake valve (See Figure 1 (14)) and one exhaust (See Figure 1 (15)) valve controlled during repetitive, sequential exhaust, intake, compression and expansion strokes of said piston comprising: providing a closed exhaust valve and a closed intake valve during an expansion stroke of said piston (See Column 1 Lines 1-40); providing an open exhaust

valve and a closed intake valve during an exhaust stroke of said piston (See Column 1 Lines 1-40); providing a closed exhaust valve and a closed intake valve during an intake stroke of said piston to establish a low pressure condition within the combustion chamber (See Column 9 Lines 48-54); providing an open exhaust valve and an open intake valve during said intake stroke of said piston to ingest (See Column 8 Lines 4-7, Column 10 Lines 52-56) combusted gases and fresh air, respectively, into said combustion chamber; and, providing a closed exhaust valve and a closed intake valve during a compression stroke of said piston (See Abstract).

Regarding claim 5 Miyakubo discloses providing a rebreathe event wherein said exhaust valve is open during at least a portion of the intake event (See Column 1 Lines 53-67, Column 2 Lines 1-15, Column 8 Lines 4-7, Column 10 Lines 52-56).

Regarding claim 6 Miyakubo discloses said rebreathe event is initiated subsequent to initiation of said intake event (See Column 1 Lines 53-67, Column 2 Lines 1-15, Column 8 Lines 4-7, Column 10 Lines 52-56).

Regarding claim 7 Miyakubo discloses said rebreathe event is terminated prior to termination of said intake event (See Column 1 Lines 53-67, Column 2 Lines 1-15, Column 8 Lines 4-7, Column 10 Lines 52-56).

Regarding claim 11 Miyakubo discloses said rebreathe event is terminated prior to termination of said intake event (See Column 1 Lines 53-67, Column 2 Lines 1-15, Column 8 Lines 4-7, Column 10 Lines 52-56).

Regarding claim 16 Miyakubo discloses said low pressure event is established by controlling phasing of an exhaust event exhaust valve closure and the intake valve opening (See Column 1 Lines 53-67, Column 2 Lines 1-15, Column 8 Lines 4-7, Column 10 Lines 52-56).

Regarding claim 17 Miyakubo discloses the exhaust event exhaust valve closure absolute phase relative to exhaust stroke top dead center is not greater than the intake valve opening phase after exhaust stroke top dead center (See Column 1 Lines 53-67, Column 2 Lines 1-15, Column 8 Lines 4-7, Column 10 Lines 52-56).

Regarding claim 18 Miyakubo discloses the exhaust event exhaust valve closure occurs before exhaust stroke top dead center (See Column 1 Lines 53-67, Column 2 Lines 1-15, Column 8 Lines 4-7, Column 10 Lines 52-56).

Regarding claim 19 Miyakubo discloses the exhaust event exhaust valve closure occurs after exhaust stroke top dead center (See Column 1 Lines 53-67, Column 2 Lines 1-15, Column 8 Lines 4-7, Column 10 Lines 52-56).

Regarding claim 31 Miyakubo discloses closure of the exhaust valve that is open during the exhaust stroke occurs at an absolute phase angle relative to exhaust stroke top dead center about not greater than the phase angle after exhaust stroke top dead center at which opening of the intake valve occurs (See Column 1 Lines 53-67, Column 2 Lines 1-15, Column 8 Lines 4-7, Column 10 Lines 52-56).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-4, 8-10, 12-14, 21-29, 32-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyakubo et al. (PN 6,336,436) in view of design choice.

Miyakubo discloses the invention as recited in claims 1, 15, 30 above, however, fails to disclose a combustion chamber pressure, exhaust valve lift range, rebreath, exhaust valve and intake valve event angular ranges. It is the Examiner's position that the various particular pressures, lift ranges and angular ranges would have been an obvious matter of design choice well within the level of ordinary skill in the art depending on design variables such as engine load and speed requirements. Moreover, there is nothing in the record which establishes that the claimed applied forces presents a novel or unexpected result (See *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975)).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Atago et al. (PN 6,286,478), Shiraishi et al. (PN 6,155,217), Nada (PN 5,746,182) disclose similar valve operation methods.

Any inquiry concerning this communication from the examiner should be directed to Examiner Jaime Corrigan whose telephone number is (703) 308-2639. The examiner can normally be reached on Monday - Friday from 8:30 a.m. – 6:00 p.m. 2nd Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas E. Denion, can be reached on (703) 308-2623. The fax number for this group is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0861.

JC

Jaime Corrigan

Jaime Corrigan
Patent Examiner

May 02, 2004

Art Unit 3748

Thomas Denion
THOMAS DENION
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